Claims:

What is claimed is:

1. A time resolved, nonlinear complex susceptibility measuring apparatus having: a Sagnac type interference light path in which a reference and a probe light to propagate, a light pulse light source for providing a light pulse with which to irradiate a test specimen disposed in the light path and for supplying the Sagnac type interference light path with a light pulse, and a measuring instrument for measuring the intensity of interference light between the reference and probe lights, characterized in that:

the reference and probe lights are a pair of polarized lights orthogonal to each other, and

the Sagnac type interference light path is a polarized light splitting Sagnac type interference light path, and that the apparatus includes:

a direction of polarization converting mechanism for rotating a direction of polarization of the reference and probe lights by an angle of 90° in the polarized light splitting Sagnac type interference light path;

a phase difference sweep mechanism for sweeping a phase difference between the reference and probe lights that are output from the polarized light splitting Sagnac type interference light path; and

a phase difference compensating mechanism for compensating for a phase difference between the reference and probe lights prior to entry of the light pulse into the polarized light splitting Sagnac type interference light path,

whereby a phase difference between the reference and probe lights that are output from the polarized light Sagnac type interference light path is swept and a time resolved, nonlinear complex susceptibility is found from a phase difference sweep interference waveform obtained by measuring the intensity of interference light between the reference and probe lights for each of such phase differences swept.

2. A time resolved, nonlinear complex susceptibility measuring apparatus as set forth in claim 1, characterized in that the phase difference compensating mechanism for compensating for a phase difference between the reference and probe lights comprises a $\lambda/2$ and a $\lambda/4$ wavelength plate disposed between the polarized light splitting Sagnac type interference light path and the light pulse light source for supplying the light path with the light pulse whereby rotating the $\lambda/2$ wavelength plate allows compensating for a phase difference between the reference and probe lights.

3. A time resolved, nonlinear complex susceptibility measuring apparatus as set forth in claim 1, characterized in that the direction of polarization converting mechanism for rotating a direction of polarization of the reference and probe lights by an angle of 90° in the polarized light splitting Sagnac type interference light path comprises a $\lambda/2$ wavelength plate disposed in the light path.

4. A time resolved, nonlinear complex susceptibility measuring apparatus as set forth in claim 1, characterized in that the phase difference sweep mechanism for sweeping a phase difference between the reference and probe lights that are output from the polarized light splitting Sagnac type interference light path comprises a $\lambda/4$ wavelength plate and a light polarizer which are disposed between an output end of the polarized light splitting Sagnac type interference light path and the measuring instrument for measuring the intensity of interference light between the reference and probe lights whereby rotating the $\lambda/4$ wavelength plate allows sweeping a phase difference between the reference and probe lights.

5. A time resolved, nonlinear complex susceptibility measuring apparatus as set forth in claim 1, characterized in that the phase difference sweep mechanism for sweeping a phase difference between the reference and probe lights that are output from the polarized light splitting Sagnac type interference light path comprises

a $\lambda/4$ wavelength plate and a light polarizer which are disposed between an output end of the polarized light splitting Sagnac type interference light path and the measuring instrument for measuring the intensity of interference light between the reference and probe lights whereby rotating the light polarizer allows sweeping a phase difference between the reference and probe lights.